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# THE SEARCH FOR HEALTH

A Report from
The National Institutes of Health
Bethesda, Maryland

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## Dizziness-Hope Through Research

Most of us can remember feeling dizzy—after a roller coaster ride, maybe, or when looking down from a tall building or when, as children, we would step off a spinning merry-go-round. Even superbly conditioned astronauts have had temporary trouble with dizziness while in space. In these situations, dizziness arises naturally from unusual changes that disrupt our normal feeling of stability.

But dizziness can also be a sign that there is a disturbance or a disease in the system that helps people maintain balance. This system is coordinated by the brain, which reacts to nerve impulses from the ears, the eyes, the neck and limb muscles, and the joints of the arms and legs. If any of these areas fail to function normally or if the brain fails to coordinate the many nerve impulses it receives, a person may feel dizzy. The feeling of dizziness varies from person to person and, to some extent, according to its cause, it can include a feeling of unsteadiness, imbalance, or even spinning.

Disease-related dizziness, whether it takes the form of unsteadiness or spinning, is fairly common in the older population. Today, both older and younger people with serious dizziness problems can be helped by a variety of techniques—from medication to surgery to balancing exercises. Such techniques have been developed and improved by scientists studying dizziness.

To understand what goes wrong when we feel dizzy, we need to know about the vestibular system by which we keep a sense of balance amid all our daily twisting and turning, starting and stopping, jumping, falling, rolling, and bending.

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The vestibular system is located in the inner ear and contains the following structures: vestibular labyrinth, semicircular canals, vestibule, utricle, and saccule. These structures work in tandem with the vestibular areas of the brain to help us maintain balance.

The vestibular labyrinth is located behind the eardrum. Within the vestibule and the semicircular canals are patches of special nerve cells called hair cells. Also located in the inner ear are tiny calcium stones called otoconia. When you move your head or stand up, the hair cells are bent by the weight of the otoconia. The bending of the hair cells transmits an electrical signal about head movement to the brain. This signal travels from the inner ear to the brain along the eight crainial nerve—the nerve involved in balance and hearing. The brain recognizes the signal as a particular movement of the head and is able to use this information to help maintain balance.

For those who are healthy, equilibrium is a sense often taken for granted. People can't see their labyrinth, even though it is as much a sense organ as the ears or the eyes. But when it is injured, an ability vital to everyday living is lost.

Scientists already understand a great deal about the labyrinth's function and the way the brain maintains balance. Further research into this complex system should help those who are incapacitated by dizziness when the balance system goes awry.

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